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# DESCRIPTIVE AND NORMATIVE SCIENCES.[1]

THE general division of sciences into descriptive and normative has long been one of the commonest devices used in classification, so much so that it has become almost traditional to refer to it even in the elementary text-books of logic and ethics. There obviously is a great difference between such sciences as physics on the one hand and ethics on the other, and the distinction clearly turns in some way upon the place of norms or values in the two. Ethics is possible only because men judge some conduct to be good and other bad, whereas it seems as if there might be a science of physics even if objects never were classified in this way. It is quite natural, therefore, that ethics and other sciences that imply valuation should have been called normative, and that the sciences which approach their subject matter with a more disinterested attitude should have been called descriptive. These latter sciences, it is said, attempt to state merely *what is*. The laws of physics, for example, are statements of uniformities that occur and recur in the existing and indestructible world of matter. Its subject matter is sheerly existent, and as such it is neither good nor bad. If its objects do in fact serve a useful purpose, an art may be created depending upon the science, as engineering depends upon physics and other sciences, but this use is extraneous to descriptive science as such. The most destructive catastrophe in nature,—the volcanoes, earthquakes, and hurricanes,—are as orderly, in the scientific sense of the word, as, to borrow Huxley's phrase, the 'sabbatical peace of a summer sea.' Ethics and logic, on the other hand, appear to be of quite a different kind. Their rules are said to state not what is but *what ought to be*. Thinking is correct or incorrect; conduct is moral or immoral. The laws of logic and of ethics, then, must show the norms to which thinking and acting ought to conform, whether they do or not. The normative sciences are evaluative rather than factual.[1] But the distinction thus made, simple as it seems, falls at once into a difficulty: What is the source from which logic and ethics derive their norms? If from the norms actually used in thinking and acting, are they not then descriptive sciences? Clearly the stoutest defender of the normative character of ethics does not suppose that ethics creates moral values or can do otherwise than study morality as it exists; but this admission goes far to blur the conception of ethics as a science of ideals.

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[1] A paper read before the Philosophical Union of the University of California, December 22, 1911.

Objections of this kind have contributed to a wide-spread reaction against the whole conception of normative science. The only really normative discipline, it is said, is an art rather than a science. In so far as logic and ethics furnish a technique for thinking and acting, they are arts; in so far as they are sciences, they are descriptive, as all science must be. The term 'normative science' is self-contradictory. A science, it is said, is purely cognitive and cannot, in its capacity as a science, lay down a rule for action; it deals only with facts and generalizations of fact. Now moral norms and good and bad conduct are existing processes, as are also logical standards and correct and incorrect thinking. It is possible to make these the subject of special and systematic inquiry, and when this is done there arise the sciences of ethics and logic. These sciences are normative only in the sense that their subject matter is composed of norms; their methods are descriptive like those of other sciences.[2]

The tendency at work here is no doubt wholesome. Ethics, especially idealist ethics, has probably had about it too much of what Professor Santayana calls the 'genteel tradition'; and in any case the effort to give to logic and ethics a larger empirical content is always valuable. Whether a science is normative or descriptive, it presumably cannot have too large a store of facts. In many respects perhaps the most valuable work done in recent years for ethics has been in a sense extra-ethical—I mean the many admirable studies in the history and evolution of morality, just as, in many respects, the most useful work for logic has belonged quite as much to genetic psychology or the psychology of cognition. But while the attack of the so-called 'scientific' ethics upon the older conception of the science has had many good results, it has not contributed a great deal to the methodological conceptions involved in the conception of normative science. That science is not an art, and that logic and ethics have a subject matter like other sciences, are indeed true and worthy to be borne in mind, but these contentions of themselves do not go very far toward an accurate logical statement of the principles of these or any other sciences. Even the definition of normative science as a science which has norms for its subject matter is not of much consequence, for it leaves the question of method untouched; and even the most superficial classification of the sciences can scarcely adopt difference of subject matter as its principle. The point at issue involves the question whether evaluation plays an essential rôle in scientific method or whether it is wholly superseded by description, the latter being assumed to be a purely non-evaluative process, and it is to this methodological question that the present paper will be devoted.

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[1] *Cf.*, for example, Mackenzie's *Manual of Ethics*, 4th ed., pp. 4 ff.; Sidgwick, *Methods of Ethics*, 6th ed., pp. 1 ff.; Wundt, *Ethics*, Eng. trans., Vol. I, Introduction, Section 1. Among logicians Sigwart takes the rather extreme position that logic is primarily an art; *Logic*, Eng. trans., Section 2. A wide range of references to logicians who regard their science as normative is given by Husserl, *Logische Untersuchungen*, I Bd., Section 13.

[2] See, for example, Simmel, *Einleitung in die Moralwissenschaft*, I Bd., pp. 321 ff.; McGilvary, "Ethics, a Science," *Philosophical Review*, Vol. XII, p. 629.

The question in this form is most pertinent for methodology, especially at the present time. For, so far as one can estimate a tendency in current philosophy, there appears to be a strong and growing bias toward giving to evaluation a place of central importance in all experience, to regard it, one might almost say, as the very essence of consciousness. Indeed, the problem has run through much of the philosophy of the nineteenth century. When Kant constructed his theory of knowledge, it appeared to him to be essential, for the sake of preserving both the validity of knowledge and the security of morals, that evaluation should be driven as far as possible from cognition. Accordingly, he turned over the world of possible experience *in toto* to the mechanical principles of explanation, while he conceived the moral will to operate primarily in a world from which experience was rigidly excluded. Valid knowledge was conceived to rest upon the necessary and *a priori* categories, and the categories, being conceived for the most part as ready-made forms of the understanding itself, operated throughout all experience in a thoroughly automatic and non-teleological fashion. On the other hand, moral evaluation was conceived to rest purely upon the reason, and its norms not only could not be determined by experience but might even never be realized in experience. But the distinction was no sooner made than it had to be broken through. Kant himself supplemented the categories with the regulative principles, which he regarded as absolutely essential for the guidance of knowledge, though they could never be constitutive of experience itself,[1] and certainly not the least instructive part of Kant's philosophy is the eternal see-saw by which he tries to maintain and yet to escape from his distinction between the realm of facts and the kingdom of ends.

Nor did the problem perish with Kant. In one form or another the struggle to find a tenable standing-ground between the divergent points of view is the great problem of post-Kantian philosophy. And always as the struggle continued the impossibility of outlawing valuation from human experience became clearer. Nothing in the character of nineteenth century philosophy has been more striking than the extent to which some form of voluntarism has prevailed in it. Not only has it been made the cornerstone of philosophy by Fichte and Schopenhauer and all who followed them, but even with Hegel the most vital of all problems was to find a conception of reason broad enough to include the will and all its works. Kant's ethics was beyond question the weakest part of his system, but nevertheless the primacy of the practical reason has been a sort of philosophical axiom for his successors. The stream has broadened and deepened down to the present time. Pragmatism is founded upon the universality of valuation in all experience, cognitive and otherwise. Its attack upon Hegelian idealism has turned upon the adequacy of the latter's treatment of purpose as a logical category; that in some way purpose was essential to knowledge was not in issue. In psychology, as the problem of reasoning came more to occupy the center of the stage, more and more has been made to turn upon attention and attitude and less upon the quasi-mechanical combination and interaction of mental elements.

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[1] On the untenability of the distinction between constitutive and regulative principles, see Albee, "The Significance of Methodological Principles," *Philosophical Review*, Vol. XV, p. 267.

It is certainly pertinent, therefore, in view of the imminence and persistence of the problem, to inquire whether the ordinary conception of the descriptive sciences as entirely non-valuative is really justified. In order to make the discussion as definite as possible it will perhaps be best to develop it about a typical presentation of the supposed contrast between descriptive and normative sciences, and for this purpose I have chosen Husserl's careful treatment of the question, particularly his discussion of "Theoretical Disciplines as the Basis of Normative Disciplines."[1] Husserl's thesis is that "every normative and likewise every practical discipline rests upon one or more theoretical disciplines in so far as its rules must possess a theoretical content inseparable from the thought of valuation." [2] This thesis is supported as follows. To assert that something ought to be is to judge it with reference to its goodness or badness; to say that 'A soldier ought to be brave' means that 'a soldier who is not brave is a bad soldier.' Such a judgment, unless it is purely verbal, involves a conception of certain qualities which the object must have in order to be good, and every quality which is essential to its goodness can be part of such a judgment of value as that instanced above. But values are relative and comparative; we do not merely judge things to be good or bad but also better or worse, best or worst. In consequence a group of particular norms implies a fundamental norm which defines the place of the subordinate norms in a system of values. The 'greatest happiness principle' in utilitarian ethics is such a fundamental norm. It bears a relation to the particular normative judgments analogous to that which the number system bears to judgments of numerical relation in arithmetic. The normative science, then, is produced by the attempt to study scientifically a group of normative propositions that depend upon a fundamental norm. The fundamental norm is the principle of unity in a normative science. This marks it off from the theoretical science in which the principle of unity is the regularity of the things themselves. To give Husserl's own statement: "The theoretical disciplines on the other hand lack this central relation of all investigation to the attitude of value, this attitude being the source of a controlling interest in the application of standards. The unity of their investigations and the correlation of their facts (*Erkenntnisse*) is directed solely by the theoretical interest, which is directed to the investigation of things which actually belong together (*i. e.*, which belong together theoretically according to the orderliness of things) and which therefore, as belonging together, are to be investigated together."[1] If these premises be granted, the dependence of the normative upon one or more descriptive sciences is clear enough. The normative judgment depends upon theoretical judgments stating the factual content of the things valuated. These factual connections of qualities belong to the subject matter of some theoretical science. The normative science, therefore, must get its basis in fact from the theoretical sciences. It is a new grouping of facts chosen here and there from the theoretical sciences and brought into a new unity by their relation to some fundamental value.

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[1] *Logische Untersuchungen*, I. Bd., ii. Kap., Sections 14 ff.

[2] *Op. cit.*, p. 40.

The preconceptions in this account of the descriptive and normative sciences should be carefully noted. In the first place, the theoretical sciences arise from the theoretical interest, the interest in knowing things exactly as they are and without reference to any ulterior purpose that they may serve. In order to think about a subject at all, interest is of course necessary. But in order to think about a subject theoretically, this interest, it appears, must be of a peculiarly disinterested kind.[2] Whereas all other forms of interest seem to throw things together in a merely human and evaluative order, the theoretical interest is precisely what enables us to know the world 'according to the regularity of things themselves.' It is a transparent medium which permits the objective relations of the things themselves to pass over into consciousness. The interest, therefore, is not a factor in the resulting knowledge, or at least it is a factor only by virtue of its complete self-effacement. In the second place, it is assumed that the knowledge, or more broadly the science, which results from the exercise of theoretical interest consists of descriptive statements in which no reference to end or value is implied. Such knowledge states *what is* absolutely; its laws present the relations of things as they are 'according to the orderliness of the things themselves.' The objects themselves, and not their relation to any value, determine what things belong together and what things must be classified apart. The nature of objective reality is the complete and sole determinant of theoretical categories. Let us now examine these two assumptions in order to determine whether they are tenable accounts of descriptive science, and let us begin with Husserl's conception of theoretical interest.

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[1] *Op. cit.*, p. 46.

[2] *Cf.* Simmel, *op. cit.*, p. 321, where a similar position is taken regarding theoretical interest.

The conception is not really so clear as it seems. No doubt a large number of men are actuated by what may be roughly called a theoretical interest; that is, they are devoted to the pursuit of some science without much thought of the useful application of their discoveries. No doubt also most men feel more or less frequently and more or less strongly the touch of disinterested curiosity. Certainly no trait is of greater human importance than the capacity to postpone action and pursue knowledge in the meantime. But that these facts justify Husserl's inference is not so clear. In the first place, if the question is merely one of personal motive, the scientist's ulterior motive does not appear to have any bearing on the character of his science one way or the other. The chemistry of cement is not less a part of chemistry because it is studied by a man who wants to build houses; whether or not the chemist has such an ulterior motive is a matter of indifference to the methodology of the science. To be sure, he must not let a desire for a given result hurry him on to a hasty presumption or an ill-founded judgment, but this is no truer of the theoretical sciences than of the normative, or of the arts, or of the most thoroughly utilitarian thinking. All thinking is disinterested in this sense of the word, but it by no means follows that thinking, in order to be good, must contain no factor of purpose or value. The fact that under certain conditions a purpose can produce a fallacy certainly does not justify the conclusion that a purpose always produces a fallacy or that the way to avoid fallacies is to eliminate purposes.

It is a misfortune that this question has so frequently been discussed as if the whole point were to be settled by reference to the purpose or interest of individual thinkers. For example, it was a misfortune that the earlier presentations of pragmatism depended so much upon the reflex arc concept, for this emphasis tied the new point of view to an exceedingly doubtful psychological theory of meaning, and it caused the question to be discussed as a matter of individual psychology more than the merits of the case required. The social aspects of disinterested knowing were alluded to in the discussion but they were not sufficiently emphasized. It must always be borne in mind that, on the one hand, science is a social product, and, on the other, a social institution. The former point has often been insisted upon, but the latter is perhaps the more important in this connection. It means that the sciences have a life of their own, and a function in human experience, that entirely transcends the attitude of individual scientists toward their work or toward life in general. As an existing social institution a science commands the devotion of the individual scientist and dominates his individual purposes exactly as politics may command the devotion of the statesman. In such a case one may say in a figure of speech that the institution has an end of its own which may or may not coincide with the purpose of the individual who, for the time being, is the human embodiment of the institution. The creation of such an institution is a case of social differentiation and the division of labor, and the division of labor is possible only because an ultimate end can be submerged temporarily in the attainment of a subordinate end, or perhaps even be submerged permanently for a given individual. It is clear, however, that such a submergence in no wise justifies the conclusion that the product of the divided labor is the result solely of the interest of the highly specialized laborer. There is always the further question: What social ends are built into the structure of the institution itself so that they form an ineradicable prius to the purpose of any given individual who maintains the institution? In the case of the sciences this type of criticism cuts two ways. If it shows the danger of regarding cognition as a process in the individual mind, it shows equally the danger of regarding it only as it appears in the institutionalized sciences. The first skirts the precipice of subjectivism and the other wanders in the desert of intellectualism or naturalism.

If we regard the sciences in their broader social aspect, it is clear at once how inadequate is the reference even of the descriptive sciences to mere 'theoretical interest.' In the long run no one is content, not even the scientist himself, that science should merely know; it must know something worth while, something that yields a satisfaction over and above that which comes merely from finding it out.[1] Perhaps no critical category is more frequently applied to the judgment of scientific work than that of importance or significance. A result in four decimals may be perfectly accurate, but if the data are such that only two decimals are significant, the additional two are an intrusion and an impertinence. The individual investigation must bear at some point upon the total structure of the science; it must 'make a difference' to those who care about that kind of investigations. If it does not, it may be accurate to a nicety but it is not good scientific work. It may be objected, however, that the significance in these examples may be significance for a purely theoretical interest. It may, of course, precisely because the science as an institution affords a norm by which the value of the individual investigation may be at least roughly measured. But the science itself is always being judged at the bar of human life. No science could persist for a decade that did not possess a human interest of some sort; that did not appeal to impulses other than disinterested curiosity and touch values other than those of abstract cognition. When, therefore, the scientist attacks a purely theoretical problem, he is working within a field already conceived to have value. The return in value from any given investigation, or even from the whole science, may be unexpectedly large or unexpectedly small, for values themselves are always growing or shrinking, partly as a direct outcome of scientific results.

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[1] A singular example of the way in which this aspect of science can be recognized in set terms and yet relegated to a place of insignificance in methodology can be found in Royce's "The Sciences of the Ideal," an address delivered before the Division of Normative Science of the Congress of Arts and Science at the St. Louis Exposition in 1904, Report of the Congress, Vol. I, p. 151. Royce here denominates philosophy and mathematics 'sciences of the ideal,' because they rest upon free construction rather than upon empirical data. The free construction is limited, however, by the condition that "the exactly stated ideal hypothesis . . . must possess . . . sufficient intrinsic importance to be worthy of scientific treatment" (p. 154). It is impossible to withhold the comment that the qualification is more important than the thing qualified.

It ought to be clear that this conception of science is not equivalent to the philistine demand for useful results; it merely points out the actual relation between cognition and value and does not in any way prejudge the question as to what ends are really the most valuable. In essence it means only that methodology ought to recognize the fact that the 'theoretical interest' is not an isolated and fragmentary part of human nature that works best when it is kept aloof from all other human interests. In order to be a thinker a man need not become temporarily a disembodied spirit. Thinking originates in the ordinary evaluating experience of the individual and its results return to and reconstruct that experience. The sciences originate likewise in the ordinary experience of the race, which is primarily a struggling, willing, evaluating experience, and they are held always more or less closely to account for their relations to those things which men hold to be worth while. And there is small reason to suppose that these and similar facts are irrelevant to the method of science. To take a single example, the principles of mechanics, interpreted in their literal abstractness, would make every puff of smoke from the stack of a locomotive exactly as important as the turning of the wheels and the pulling of the load;[1] that is to say, both are equally good examples of the purely mechanical principles on which locomotives are built, but it would be absurd to say that mechanics has been developed, or could have been developed, on the assumption of any such parity of value. The one is part of the working of the machine and the other is epiphenomenon. The conception of a machine is purely teleological and who can doubt that this value, this relation to end, has checked and guided the development of mechanical science at every step?

Husserl's theoretical science, then, the science pursued only from theoretical interest and without reference to the significance of the objects studied, does not exist. Let us now test the second of his two assumptions—the science of the absolutely existent. It will perhaps be well to begin by inquiring precisely what the existent means in this connection, for the term is not perfectly clear. Primarily and in ordinary usage the existent refers to the present time; it gets its content by contrast with that which was in the past but has now ceased to be, or with what may be in the future but has not yet arrived. In this sense the category of the existent has a chronological value and a critical value as against the prejudices which tie men to the past or baseless hopes for the future. The appeal to the actual thus comes, by a natural extension of meaning, to be almost synonymous with the appeal to direct experience. The existent is not only the present but the presented or the presentable, that for which there is evidence of observation. But in this, its most common and most meaningful sense, the existent is clearly not the special object of any particular science. It is the property and tool of all but the end of none, least of all of those sciences, such as mechanics, which are most frequently termed descriptive. The present time, however, is not a mathematical point but a state which can vary indefinitely in duration; it is a second, a day, or a year according to the context. Accordingly there arises a further natural extension of meaning whereby the existent is stretched to include that which always is, and which is therefore in a sense always present. The existent in this new sense is that in which the passage of time is irrelevant. The judgment expressing such an existent has lost, so far as possible, the categorical reference to any 'here and now' and has taken on the hypothetical form which expresses permanence of relation, the permanence again being understood not to imply any special reference to the passage of time.

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[1] The example is taken from Bosanquet's *Logic*, Vol. II, p. 184.

This latter sense is the one which most nearly represents the meaning intended in the phrase, 'a science of the actual.' The phrase really connotes universality—*quod semper, ubique, et ab omnibus*, as the scholastic definition had it. Mechanics is a science of the actual in this sense of the term. Now the question arises whether this type of science excludes all that can properly be called ideals or norms, as is commonly supposed. The degree to which mechanics approximates to mathematics in its character and method, and the frequency with which mathematics is held to be the science of the ideal *par excellence* at once suggests an answer to the question, but it will be well not to make any assumption about the nature of mathematics. Let us rather examine briefly the nature of mechanical laws themselves. There is perhaps no mechanical law, certainly none of great generality and fundamental importance, that can be exemplified and directly verified in actual experience. The conception of the actual as the timeless really reverses the conception of it as the directly experienceable. The character of a mechanical law as applying to the universally existent precludes the possibility of its gaining actuality in the more usual sense of the word. The conditions laid down in the law are so highly idealized that they cannot be actualized. In the practice of the science, this fact is exemplified by the singular usefulness of the method of approximations in formulating its laws. The law states what apparently would be true if a pure case ever were isolated. The law, for example, that a body in motion moves in a straight line unless it is deflected by an outside force, is a case in point. The evidence on which the law rests is simply the greater and greater degree in which a body does so move as interfering conditions are progressively removed. Similarly, the law of inertia, that a body maintains the state of motion or rest in which it is so long as it is not acted on by an outside force, is proved by the fact that a body does continue to move longer and longer as friction and other losses of energy are eliminated. But the law is not susceptible of direct proof because the experiment cannot really be tried; no body ever is completely screened from outside forces. The law states what ideally would be true in the ideal case.

These laws, then, and others like them, are really expressions of mechanical ideals and they act as norms with reference to the subject matter of the science.[1] They represent the ideals of simplicity and intelligibility which introduce order into an otherwise chaotic manifold of physical actualities. In a certain sense, it is scarcely straining language to say that they indicate what existing physical systems *ought* to be; what they are ideally when irrelevant complications in the crudely actual have been eliminated. Now it is this ideal character that gives the law its value for the scientist. It is not a rescript of the empirically actual. In the now popular phrase, it is a working hypothesis, which means that it is normative for the scientist's experience, controls his investigations, and gives him a reasonable understanding of the way in which bodies may be expected to behave. It is a standard by which the scientist can judge the phenomena he is dealing with.

It may be objected, however, that the term norm as applied to these laws is strained, because, after all, the law really is completely exemplified in every particular case, even though it is impossible to show that this is so. The conditions may be so complicated that they defy human analysis, but there is every reason to suppose that the law holds absolutely and would be found to hold if it were possible to take account fully of every factor. The law is a norm, therefore, only on sufferance so to speak, pending the discovery of more perfect analysis, or only by virtue of the weakness of the human intellect; in itself it is an absolute fact. The objection is really a reassertion of the ontological validity of the scientific law as against the instrumental or functional conception of it, and this point is too large to discuss here. One can only say that analysis always is imperfect and in the nature of the case apparently always must be. But the objection has significance because it brings to light an essential characteristic of the mechanical point of view, a characteristic inseparable from the timeless nature of its laws. This characteristic is the assumption that every apparent exception to the law must be merely the result of unanalyzed, or perhaps unanalyzable, complexity in the combinations of the phenomena under examination. The assumption is that complete analysis would result in the breaking up of the complexity into a certain number, perhaps an indefinite number, of simple relations identical with those stated in the law. Explanation of this kind, therefore, always tends to conceive phenomena as combinations of self-identical units or homogeneous forces, and it is a postulate that qualitative difference must, so far as possible, be expressed as quantitative relations between homogeneous elements. What cannot be so expressed must be ruled out as irrelevant. Different colors of light, for example, can be symbolized by wave lengths of hypothetical ether vibrations, but the concrete qualitative distinctions thus symbolized are then pushed over into another sphere of existence and left there to be otherwise dealt with, or not dealt with at all, as the case may be.

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[1] The same conclusion has been stated by Albee, "Descriptive and Normative Sciences," *Philosophical Review*, Vol. XVI, p. 40.

Now the scientific law of this type is capable of a high degree of exactness, as everyone knows, but its exactness is paid for with the highly stereotyped form which it imposes on its subject matter. Its world is a world of timeless unchanging entities where there can be literally no new thing under the sun. From the point of view of mechanics there can be no change except change of position and direction in a perfectly homogeneous space; there can be no novelty except a new combination of the old elements. Time for mechanics is a homogeneous quantity; all its processes are ideally reversible. Now it is true that objects which can be conceived satisfactorily in this way are pervasive of our experience, yet after all they form only the substratum of it. Men are interested, perhaps most deeply interested, in precisely those phases of things which are irrelevant from the mechanical point of view. The vast majority of our experiences, I presume, would be hopelessly garbled if we had to conceive them in terms of timeless actualities and as a mere repetition of identities. As Professor James was never tired of insisting, our most vital experiences are those in which time has not only quantity but direction, in which processes are not reversible but are valuable precisely because they bring to the birth something which did not exist before. The present in which we live is always big with the future, and the past to which we go back in history is a time when other men were realizing new and significant values not before known. All history and all evolution are filled with real changes—with just those qualities which, from the mechanical point of view, are irrelevant and indeed inconceivable.

The character of the norm as it appears in the mechanical sciences is the outgrowth of the peculiar form of abstraction to which the subject matter is subjected. What, then, will be the nature of the norm when it is developed with reference to the non-mechanical phases of experience? In general it seems clear that it must take on more and more the character which we commonly attribute to a norm; it must include more and more processes which are essentially evaluative and must take more and more account of ends. I have tried to show that valuation is not absent even from the most completely descriptive sciences, but that in these cases the norm is scarcely intrinsic to the subject matter. It belongs rather to the on-looker who applies his interest to the objects studied. But when one begins to deal with irreversible processes, processes which essentially have direction and therefore tend some whither, one finds that this type of subject matter develops ends, and therefore values, which have to be respected. The laws in such cases become more and more teleological and in consequence more obviously normative than they are in mechanics.

To take a single example, it appears to be quite impossible to define an evolutionary series except by marking out steps or stages which lead toward some final goal, this goal being taken temporarily at least as an end. In order that such a series may exist at all, the reality of change must be assumed as a datum; change cannot be taken as a mere complication of preëxisting elements without destroying the concept of evolution itself. The existing species must vary, slightly or broadly, indefinitely or orthogenetically, if a new species is to appear. The old type must be broken through, the exactness of its definition must be blurred, or the evolution fails to take place. And once a series of such changes has established itself, each change can properly be said to have value as a means to the determination of the new type; they contribute to an end and this is only another name for value. The continuity of the series is nothing but this progressive creation or modification of value. Naturally the end in such a case need not have practical human value; it has no moral significance perhaps, and of course it need not be an end consciously chosen by the evolving object. On the other hand, the end is not in any proper sense merely the subjective attitude of the human investigator; it is not dependent on the scientist's will in any sense in which the properties of an atom are not so dependent. The end in this case, like the atom, is simply a category of explanation, and it is on quite the same logical basis so far as its validity is concerned. As a matter of fact, the biological sciences are filled with teleological conceptions, as the constant use of such terms as function, adaptation, organism, deterioration, progress, and a host of others like them abundantly testifies.

One further step in the development of scientific norms may be mentioned in conclusion—the case where the subject matter of the science is marked by consciously chosen ends, as in the sciences that deal with human institutions. Here what Professor Santayana calls the 'ideal dimension of experience' comes most clearly into evidence, and the reversible process and the timeless law play an insignificant rôle. Here teleology is not only *de facto* but to a large extent real, and here the values concerned are always human values,—not necessarily, indeed, the values of any given individual or of any special time, but always values that have developed in the course of human history and have in some way proved significant for mankind. These, therefore, are the normative sciences *par excellence*. They not only have values for their subject matter but their procedure is at least implicitly normative. Thus history, which is in some respects the most inclusive of all the humanistic sciences, cannot be written except with reference to the evolution of value. Not that the historian needs to express his own individual preference for this or that historical character, or that he is primarily engaged in condemning this or praising that; whether he does this or not is trivial and largely a matter of temperament. But his selection among all the innumerable facts that might be chronicled must be determined by the bearing they had upon some valuable outcome, and the sheer fact that he takes this outcome as valuable is itself a process of valuation. In every case the outcome taken as an end is one to which human beings have attached an especial value. And this relation to value is not temperamental but methodological. Again, to return to the case of ethics, it is not enough to say of the moralist that he describes and explains values. He certainly need not exhort—this again is a matter of temperament largely—and he certainly ought not to treat his subject matter from the point of view of his personal preferences, but he must treat it from a generally evaluative point of view. If, for example, he commits himself to statements of this kind: 'Such and such conduct is detestable to normal human beings'—a statement which Professor McGilvary calls 'purely descriptive'[1]—he certainly has gone far beyond mere description. The 'normal human being' in this case is presumably not an arithmetical average or even a type that can be determined exclusively by counting heads. If such a statement has any special ethical significance it must represent the judgment of a certain moral type, and the determination and choice of the type by ethics must be implicitly evaluative. The only way to avoid evaluation is by refusing to select among possible types, and this is precisely the same as refusing to give any systematic account of moral judgments whatever.

The main theses of this paper may be summarized as follows: The traditional distinction between descriptive and normative sciences will not hold. In so far the defenders of 'scientific ethics' are quite right, but the reason they allege—that all science has a factual subject matter—does not go to the root of the question. The true methodological reason for abolishing the distinction is not that all sciences are descriptive but rather that all are normative. Cognition is not unrelated to processes of valuation, and relation to value is present as an essential part of the method of all science and as an ever present factor in the control and guidance of science as it develops. The sciences which have appropriated the name descriptive are those which, through the nature of the abstractions they make, come to regard their subject matter as made up of timeless entities existing in an eternal now. Even here, however, the normative character of thought appears in the ideality of the laws which standardize the crude matter of fact. The attempt to treat realities without thus devitalizing them, to preserve their character as processes, brings to light the true rôle of valuation in scientific method, a rôle which is more or less concealed in the so-called descriptive sciences. The sciences which are usually called normative—especially the humanistic sciences—are those in which the place of valuation is too clear and distinct to be overlooked.

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[1] *Loc. cit.*, p. 634.

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